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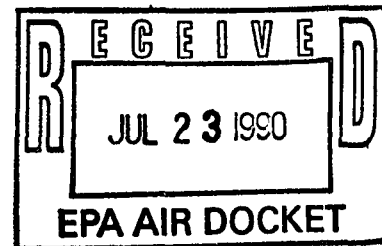
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Chrysler Motors Corporation

July 20, 1990



Air Docket (LE-131)
U.S. Environmental Protection Agency
Room M-1500
401 M Street, S.W.
Washington, D.C. 20460

Re: **Docket No. A-90-16 "Fuels and Fuel Additives; Waiver Application"**
55 FR 22947, June 5, 1990

Chrysler wishes to comment on the fuel additive application made by Ethyl Corporation requesting that the Environmental Protection Agency (EPA) waive section 211(f)(1) of the Clean Air Act. This section prohibits the sale of fuel additives which are not "substantially similar" to a base unleaded gasoline.

Ethyl desires to market the fuel additive methylcyclopentadienyl manganese tricarbonyl (MMT) to be used in concentrations of up to 1/32 gram of manganese per gallon in unleaded gasoline. Earlier waiver applications for concentrations of 1/16, 1/32 and 1/64 gram per gallon were denied by the Administrator because Ethyl did not demonstrate that MMT would not cause or contribute to any vehicle's failure to meet the emission standards.

While Ethyl believes it has thoroughly evaluated the effects of MMT to support an EPA waiver, Chrysler has the following major concerns:

- o Evidence, independent of Ethyl's study, shows that MMT does result in deposits of manganese oxides and plugging of the passages in some of the catalysts
- o MMT increases hydrocarbon tailpipe emissions
- o Ethyl's tests may not be reproducible in actual in-use conditions
- o Ethyl's tests may not be representative of current and future close-coupled catalyst systems
- o Ethyl did not test heavy-load, high-speed driving conditions which are more susceptible to catalyst plugging
- o Ethyl's test fleet did not include any light-duty trucks which currently have a useful life of 120,000 miles
- o Exposure to manganese from MMT may have adverse health effects.

**CHRYSLER CORPORATION TECHNICAL RESPONSE TO
ENVIRONMENTAL PROTECTION AGENCY**

**ETHYL CORPORATION
FUEL ADDITIVE WAIVER
FOR
METHYLCYCLOPENTADIENYL MANGANESE
TRICARBONYL (MMT)**

July 20, 1990

**CHRYSLER COMMENTS ON ETHYL CORPORATION'S MMT FUEL ADDITIVE WAIVER
APPLICATION, 55 FR 22947, JUNE 5, 1990**

Background and Introduction

On May 9, 1990, Ethyl Corporation submitted a fuel additive waiver application to the Environmental Protection Agency regarding the use of MMT at a concentration of 0.03125 (1/32nd) gram per gallon in unleaded gasoline. MMT, an octane enhancer, is commercially labeled by Ethyl as HITEC 3000.

Section 211(f)(1) of the Clean Air Act prohibits the sale of fuels or fuel additives which are not "substantially similar" to a base unleaded gasoline. However, section 211(f)(4) allows the EPA Administrator to grant waivers of section 211(f)(1) if neither the fuel nor its emission products will "cause or contribute to a failure of any emission control device or system ... to achieve compliance by the vehicle with the (applicable) emission standards."

In order to establish that MMT will not cause or contribute to a failure of any emission control device or system, Ethyl conducted an extensive research and testing program involving a 48-car fleet. The program compared exhaust emissions at 5,000-mile intervals up to 75,000 miles from paired sets of vehicles fueled on clear fuel and fuel containing MMT. Two paired sets of vehicles were extended to test the durability of engine and emission system components at 100,000 miles. The program also evaluated the effect of MMT on automotive materials, vehicle evaporative emissions and vehicle driveability.

Ethyl's results show a total emission reduction of regulated pollutants as well as economic and energy benefits. Carbon monoxide (CO) and oxides of nitrogen (NOx) emissions were reduced respectively by about 0.22 and 0.11 grams per mile (gpm). However, hydrocarbon (HC) tailpipe emissions increased between 0.010 and 0.018 gpm. Since MMT raises fuel octane by about one octane number, Ethyl believes that this increase in HC emissions will be reduced or eliminated once the refiners adjust the octane by reducing the amount of the other octane producing components (i.e., butane, aromatic compounds).

Ethyl stated that refiners would be able to reduce the severity of processing crude oil because MMT enhances octane. This would result in a reduction of annual refinery emissions. The reduced severity of processing would also decrease crude oil imports by about 30 million barrels per year (\$540 million).

This is Ethyl's third application for a waiver for MMT. Ethyl's first application was submitted on March 17, 1978 for concentrations of MMT resulting in 1/16 and 1/32 gram per gallon manganese in unleaded gasoline. Their second application was submitted on May 26, 1981 for concentrations of MMT resulting in 1/64 gram per gallon manganese in unleaded gasoline. Both of these applications were denied by the EPA Administrator because Ethyl did not demonstrate that MMT would not cause or contribute to any vehicle's failure to meet the emission standards. Although MMT has been banned by the United States and specifically by California, it has been used in Canada in leaded and unleaded gasolines for more than 10 years.

While Ethyl believes they have thoroughly evaluated the effects of MMT, Chrysler has some major concerns regarding catalyst plugging, increased HC

tailpipe emissions, testing approach, and health effects. The following sections will address these concerns in detail.

Catalyst Plugging

Based on equivalent exhaust back pressures from paired sets of vehicles fueled on clear fuel and fuel containing MMT, Ethyl concluded that MMT will not cause plugging in the catalyst. However, the following papers have shown that MMT, which forms manganese oxides (nonvolatile compounds) when burned, can physically attach itself to the catalyst.

- o SAE Paper 770655 entitled, "Manganese Fuel Additive (MMT) Can Cause Vehicle Problems" stated the following:

"Converter plugging increases engine back pressure and consequently, fuel consumption also increases, although our data indicate that the increase is quite small."

- o SAE Paper 780004 entitled "How MMT Causes Plugging of Monolithic Converters" stated that there are two contributing factors for the accumulation of manganese oxides on the face of a catalyst; temperature and concentration. High temperatures and high concentrations of MMT favor fast manganese oxide accumulation.

In tests at temperatures of 843°C (1550°F) and concentrations of 0.033 gram manganese per liter of gasoline (1/8 gram per gallon), the catalyst was 50 percent plugged in a simulated 4500 km at 88 km/hr. At 706°C (1300°F) and the same concentration, it required a simulated 90,000 km at 88 km/hr to reach 50 percent plugging. **Note: No threshold temperature below which no plugging occurred was found.**

The study also showed that plugging is directly proportional to the concentration of MMT. Approximately doubling the concentration will double the rate of manganese oxide accumulation, all other things being constant.

- o SAE Paper 890582 entitled, "Characterization of Automotive Catalysts Exposed to the Fuel Additive MMT" has shown that MMT concentrations of 1/16 gram per gallon of unleaded gasoline can cause catalyst plugging. Nine in-use catalysts exposed to MMT were removed from Canadian vehicles and analyzed. The report stated the following results:

"The manganese concentration ranged on the first brick, between a low of 1.4 weight percent for a vehicle mileage of 24,000 to a high of 6.4 weight percent for a vehicle having accumulation 33,000 in-use miles."

- o In a paper entitled, "The Effect of Fuel and Oil Additives on Automobile Catalyst Performance" (Johnson Matthey Platinum Metals Review, Vol 34, No. 1, January 1990) the following was stated:

"No experience of MMT under European driving is available, but MMT is not expected to be used in European fuel due to the possible adverse effects on catalysts, and its toxicity in the environment."

- o Ethyl Corporation of Canada's report entitled, "Update on MMT as Related to Canadian Gasolines," dated October 16, 1978 stated the following:

"Monolithic catalysts experience plugging only when the catalyst is close-coupled to the exhaust manifold (i.e., less than 8") and is exposed to unusually high inlet gas temperatures (exceeding 1500°F) for prolonged periods of time"

While these reports have shown that MMT in concentrations of 1/8 and 1/16 gram per gallon in gasoline will cause catalyst plugging, it is also known that lower concentrations may cause plugging, but at a slower rate. This could place an undue burden on Chrysler's ability to meet the proposed amendment to the Clean Air Act requiring 100,000 mile warranty for vehicle emission control systems. The proposed 100,000 mile warranty may increase the number of catalysts that will become plugged during this warranty period.

One of the Ethyl arguments for use of MMT is the lack of problems with MMT in Canada. Ethyl stated that there have been catalysts and MMT in Canada since the late seventies and no significant problems have been reported. However, Chrysler has confirmed catalyst plugging in a number of Canadian vehicles.

The enclosed photographs (No 434, 455, and 565) are pictures of three typical catalysts which have been exposed to automotive exhaust from vehicles operated on gasoline containing MMT. These catalysts were removed from Chrysler vehicles operated in Canada, and had between 40,000 and 50,000 miles use (See Table I). All three catalysts were located in close-coupled locations, but were not manifold mounted.

TABLE I

MMT DEPOSITS - CANADIAN CATALYTIC CONVERTORS¹

No.	VIN (last 8)	Model	Engine ²	Dealer Location	Delivery	Repair	Odo (km/mi)	Dealer Fault Code ³	Inspection
455	FG269803	1985 Chrysler Daytona	2.2 L-TBI (8)	Quebec	06-06-85	03-14-89	67701/42067	65-Leaks	Typical, Deposits Forming
434	HX732569	1987 Plymouth Caravelle	5.2 L-4BBL (4)	Quebec	10-24-86	02-14-89	77200/47970	67-Rattles	Plugged Approx. 35%
565	HR215976	1987 Dodge Caravan	2.2 L-2BBL (8)	Manitoba	10-01-87	03-16-89	66800/41508	14-Burned	Plugged and Sooty

NOTES:

¹ All catalysts, except No. 434, are specifically for the Canadian emission market. No. 434 is the same as the U.S. package.

² Catalyst distance (inches) from exhaust manifold outlet is shown in parentheses.

³ There is no dealer fault code for catalytic convertor replacement due to plugging or lack of power.

Catalyst 455 has deposits of manganese oxide on the front face but does not yet (at 42,067 miles) exhibit any blocked cells.

Catalyst 434 has a greater accumulation of manganese oxide on the front face and is beginning to exhibit blocked cells around the edges. This condition reduces the available catalytic surface area and thus lowers catalyst efficiency and increases emissions. Blocked catalyst cells also increase back pressure. Increased back pressure degrades engine performance and adversely effects the air/fuel calibration both of which tend to increase emissions.

The front face of catalyst 565 is almost entirely blocked. This catalyst was removed from a heavy-load vehicle (Dodge Caravan) that was powered by a small engine (2.2L). The monolithic cells are plugged by a light powdery material with a light red brown appearance covered by a very thin layer of black material. The front face was scraped and the material analyzed. The major component was manganese oxide with some oil ash and traces of lead. The black material was probably carbon from a overly rich condition just prior to catalyst removal. The plugging may have caused this overly rich condition.

Chrysler Canada has visually inspected about 400 catalysts in Windsor, Canada that have shown various degrees of plugging. These catalysts were randomly selected from warranty returns. Since the concentration range of MMT in Canadian gasoline has varied from approximately 1/32 to 1/16 gram per gallon, these catalysts, as well as the catalysts that were photographed (enclosed), could have been exposed to 1/16 or lesser concentrations. In March 1989, Ethyl also inspected forty-two catalysts at Chrysler Canada's Experimental Engineering Garage in Windsor, that had shown various degrees of plugging from marginal to severe. These catalysts were sent to Ethyl for lab analysis. In April 1990, Chrysler received the results from 6 of the 42 catalysts that showed accumulation of manganese from 0.09 weight percent (57,274 miles) to 7.01 weight percent (55,800 miles).

Chrysler has found that catalyst plugging was more pronounced on the close-coupled catalysts which are exposed to a higher temperature exhaust in comparison to its other catalyst locations. Currently, a typical Chrysler vehicle has its catalyst located between 19 and 60 inches from the exhaust manifold. Chrysler has plans to relocate many of its catalysts closer to the engine to increase the heating rate and operating temperature in order to reduce exhaust emissions further. This will result in hotter running catalysts and thus, in a greater tendency for plugging with fuel containing MMT. Ethyl's research did not address conditions that are prone to catalyst plugging (i.e., close-coupled catalyst subjected to heavy load, high speed conditions).

Hydrocarbon Emissions

The following studies, including Ethyl's, have shown that the addition of MMT in the fuel increases hydrocarbon exhaust emissions from vehicles:

- o Ethyl's Application for a Fuel Additive Waiver (May 9, 1990) stated hydrocarbon increases of 0.010 to 0.018 gram per mile.

- o CRC MMT Field Test Program (CRC Report No 503, June 1979) stated that MMT at both concentrations (1/32 & 1/16) increased tailpipe hydrocarbon emissions significantly in comparison to the fuel without MMT.

"The average tailpipe hydrocarbon emissions for all cars at 50K miles were 0.09 and 0.11 g/mile, for 1/32 MMT and 1/16 MMT respectively, above clear fuel (0 MMT)..."

The report suggests that the effects of small concentrations may be greater than a linear equation would predict.

- o SAE Paper 770655 entitled, "Manganese Fuel Additive (MMT) Can Cause Vehicle Problems" stated that MMT (concentrations 1/8 and 1/16 gram per gallon) will increase hydrocarbon emissions.

"Engine hydrocarbon emissions increased from 85 to 190 percent for the three vehicles which used MMT fuel."

"The use of MMT can deteriorate exhaust emission control systems and cause driveability complaints if vehicles operate under rigorous driving conditions."

- o CARB Staff Report 77-9-3 entitled "Manganese Fuel Additive MMT" stated that MMT significantly increased vehicle HC emissions.

"... much more data are available from the automobile manufacturers which show significantly increased "engine-out" as well as "tail-pipe" HC emissions as a result of use of MMT."

Since MMT raises fuel octane by about one octane number, Ethyl believes that this increase in HC emissions will be offset once the refiners adjust the octane by reducing the amount of the other octane producing components. However, if only cost is considered, the refiners may decide to reduce the higher-cost, high octane paraffins (from alkylation units) that pollute less rather than the lower-cost, high octane aromatics.

Ethyl believes the refiners will reduce the severity of processing crude oil because MMT enhances octane. In effect, Ethyl is passing the burden of MMT's increased hydrocarbon emission to the refiners. In addition, the refiners may be reducing hydrocarbon emissions outside the urban areas where the smog problem exists, while the vehicles would be emitting increased hydrocarbons inside the urban areas.

Ethyl claims that MMT has not caused problems in Canada. Canada does very little in-use emission testing, so the effect on emissions is difficult to determine. Also, Canada certification and compliance tests are conducted on vehicles that are fueled with clear gasoline (zero MMT).

Hydrocarbons may be the most difficult of the three emissions (HC, CO, NOx) to control now and will be the most difficult with the 0.25 HC, 3.4 CO, 0.4 NOx (g/mile) standard. The percent deterioration of the HC emissions with MMT, in

reference to a 0.41 g/mile HC standard, is 2.4 to 4.4 percent. However, the percent deterioration in reference to the future 0.25 g/mile HC standard is 4.0 to 7.2 percent. This increased hydrocarbon will place an undue burden on Chrysler to meet the proposed amendment to the Clean Air Act requiring a 0.25 g/mile hydrocarbon standard.

Testing Approach

Ethyl based its results on a 48-car fleet. The 100,000 mile test was based on only two-paired sets of vehicles.

Chrysler is concerned that Ethyl's tests may not be reproducible in actual in-use conditions over the useful life of the vehicle. Consequently, we believe it is entirely possible that the relationship between engine-out hydrocarbons, catalytic converter efficiency and tailpipe hydrocarbons will vary, with the result that hydrocarbon emissions in many vehicles will exceed the levels expected in MMT-free fuels.

It is obvious from the independent studies that MMT can cause catalyst plugging and increased HC emissions given certain conditions (i.e., close-coupled catalysts, heavy-load, high-speed driving). In fact, Ethyl stated that catalysts experienced plugging only when they are located less than eight inches from the exhaust manifold (see page 3). Accordingly, Ethyl should have addressed these conditions to prove or disprove past reports, especially since the close-coupled catalyst may be one of the emission components required to meet the future 0.25 g/mile hydrocarbon standard. In addition, Ethyl should have addressed the future 100,000 mile warranty for emission control systems more thoroughly, as well as the current 120,000 mile useful life for light-duty trucks.

Chrysler devotes considerable time, effort and resources to engineering its vehicles to meet emissions regulations. Upon the completion of rigorous testing using a representative clear fuel (without MMT), EPA certifies our cars for sale to the public. Chrysler then has certain responsibilities, under the warranty provisions of the Clean Air Act, for the vehicle emission control systems for 50,000 miles or 5 years. Thus, if a nonconformity should result from the use of fuel which contains MMT under terms of an EPA waiver, the vehicle manufacturer would be required to bear full responsibility for the necessary repairs. However, the manufacturer of the MMT would be free of any liability.

Health Effects

The Health Effects Institute has concerns regarding increased exposure to manganese. In its book entitled "Air Pollution, the Automobile and Public Health" published in 1988 the following concerns were stated:

- o "The risk of adverse health effects from manganese emissions should be characterized as unknown but not necessarily unlikely. The potential injuries are great enough to warrant further study before any significant increase in exposure is contemplated."
- o "Children in particular, may be at high risk, because as with lead

emissions, ... younger organisms absorb a larger proportion of the administered dose."

- o "...the nervous system is of interest because of the greater access an organic metal should have to the central nervous system and because of the evident neurotoxicity of Mn in primates."

In addition, CARB Resolution 77-39 dated July 7, 1977 stated the following concerns:

- o "WHEREAS, the State Department of Health has advised the Board that the increased use of manganese fuel additives represents a potential health hazard;"
- o "WHEREAS, the Board has also determined that the combustion of gasoline containing manganese additives, such as MMT, will increase ambient levels of manganese oxides, which are directly toxic to humans, and which may tend to increase ambient sulfate levels by catalyzing the conversion of sulfur dioxide to sulfate under conditions of high humidity;"
- o "WHEREAS, a large portion of the California population is already exposed to unhealthful levels of photochemical oxidant and/or sulfates, and the state Ambient Air Quality Standards for such pollutants are being exceeded in many areas of the state;"

These reports indicate that exposure to manganese from MMT may have adverse health effects. Also, should any increase in manganese emissions be contemplated, studies of the effect of manganese exposure should be undertaken.

Considerations

Ethyl claims that MMT will result in substantial environmental, economic and energy benefits. While Ethyl believes it has thoroughly evaluated the effects of MMT, Chrysler has the following major concerns:

- o Evidence, independent of Ethyl's study, shows that MMT does result in deposits of manganese oxides and plugging of the passages in some of the catalysts
- o MMT increases hydrocarbon tailpipe emissions
- o Ethyl's tests may not be reproducible in actual in-use conditions
- o Ethyl's tests may not be representative of current and future close-coupled catalyst systems
- o Ethyl did not test heavy-load, high-speed driving conditions which are more susceptible to catalyst plugging
- o Ethyl's test fleet did not include any light-duty trucks which currently have a useful life of 120,000 miles

- o Exposure to manganese from MMT may have adverse health effects.

Chrysler is concerned about the effects of fuels, maintenance and other elements affecting the vehicle that are beyond our control, because auto manufacturers have a responsibility to assure that their cars and trucks comply with the emission standards for the useful life of the vehicle. This concern is magnified by the longer useful life period and more stringent emission standards currently in the Clean Air Act bills. As emissions standards become more stringent, it will become increasingly difficult to meet them for the full useful life and avoid in-use failures that can result in very costly recalls and warranty claims.

Since the addition of MMT in unleaded gasoline can cause catalyst plugging and does cause increased hydrocarbon tailpipe emissions, its use will place an undue burden on Chrysler's ability to meet the pending amendments to the Clean Air Act (i.e., extended useful life and stricter emission standards). In addition, Ethyl's research should have placed more emphasis on the effects of MMT on anticipated future emission control technology (i.e., close-coupled catalysts exposed to higher exhaust temperatures) especially since this condition is more susceptible to catalyst plugging.

We urge EPA to carefully consider Chrysler's technical concerns, and deny Ethyl's MMT fuel additive waiver application.

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Chrysler is concerned about the effects of fuels, maintenance and other elements affecting the vehicle that are beyond our control, because auto manufacturers have a responsibility to assure that their cars and trucks comply with the emission standards for the useful life of the vehicle. This concern is magnified by the longer useful life period and more stringent emission standards currently in the Clean Air Act bills. As emissions standards become more stringent, it will become increasingly difficult to meet them for the full useful life and avoid in-use failures that can result in very costly recalls and warranty claims.

Since the addition of MMT in unleaded gasoline can cause catalyst plugging and does cause increased hydrocarbon tailpipe emissions, its use will place an undue burden on Chrysler's ability to meet the pending amendments to the Clean Air Act (i.e., extended useful life and stricter emission standards). In addition, Ethyl's research should have placed more emphasis on the effects of MMT on anticipated future emission control technology (i.e., close-coupled catalysts exposed to higher exhaust temperatures) especially since this condition is more susceptible to catalyst plugging.

We urge EPA to carefully consider Chrysler's technical and legal concerns, which we have addressed in our comments (attached), and deny Ethyl's MMT fuel additive waiver application.

Sincerely,



G. E. Allardyce
Executive Engineer
Certification & Regulatory Programs

/ja

Attachments

cc: Mary T. Smith, EPA

LEGAL MEMORANDUM IN SUPPORT OF TECHNICAL
ANALYSIS ON THE FUEL ADDITIVE WAIVER
APPLICATION OF THE ETHYL CORPORATION

This memorandum addresses legal aspects of the waiver application submitted by the Ethyl Corporation ("Ethyl") for its methylcyclopentadienyl manganese tricarbonyl ("MMT") gasoline additive. Chrysler Corporation has prepared a detailed analysis of the technical aspects of Ethyl's waiver application, including Chrysler's concerns about the effects of MMT on hydrocarbon emissions, catalyst plugging, and public health. (See Chrysler Technical Document.) This technical analysis demonstrates that Ethyl has not met its burden under the legal standard applied to fuel additive waivers.

Ethyl filed its application on May 9, 1990 seeking a waiver for its MMT additive, which is marketed under the trademark HiTEC 3000. The additive would be blended into unleaded gasoline to produce a manganese concentration of 1/32 gpg.

The standard applicable to such waiver applications is contained in Section 211 of the Clean Air Act, 42 U.S.C. § 7545. Under Section 211(f), it is unlawful for a manufacturer to introduce into commerce or to increase the concentration in use of any fuel or fuel additive for use in light duty motor

vehicles manufactured after model year 1974 if the additive is not substantially similar to any additive used in the certification of vehicles or engines from model year 1975 or subsequent model years. Section 211(f)(4) provides that the Administrator may waive this prohibition if he or she determines that:

the applicant has established that such fuel or fuel additive or a specified concentration thereof, and the emission products of such fuel or additive or specified concentration thereof, will not cause or contribute to a failure of any emission control device or system (over the useful life of any vehicle in which such device or system is used) to achieve compliance by the vehicle with the emission standards with respect to which it has been certified pursuant to section 7525 of this title.

Ethyl acknowledges that its MMT additive is not substantially similar to an additive used in the certification of 1975 or subsequent model vehicles, and seeks a waiver under Section 211(f)(4). In previous waiver decisions under this Section, EPA has examined four major issues: exhaust emissions, evaporative emissions, materials compatibility, and driveability. 1/

1/ See, e.g., EPA, Conditional Grant of Application for a Fuel Waiver Submitted by the Texas Methanol Corporation (EN-87-06) (Feb. 1, 1988) at 9.

This is Ethyl's third attempt to obtain a waiver for MMT. As in the current application, a principal issue in the two preceding applications has been the fact that manganese in the fuel increases HC emissions from the engine and tailpipe. 2/

Ethyl's 1978 application sought a waiver for concentrations of MMT resulting in 1/16 and 1/32 gpg Mn in unleaded gasoline. EPA applied a two-pronged approach to determine whether Ethyl had met the burden necessary for a waiver. First, the Agency examined whether MMT has a "statistically significant adverse HC emissions effect." In making this determination, EPA examined eight characteristics of the test data on MMT, including deterioration factors, least squares regression slopes, and maximum percent of vehicles failing the applicable standard. The Administrator determined that "MMT has a statistically significant adverse HC emissions effect at the 1/32 and 1/16 gram Mn per gallon use levels." 43 Fed. Reg. 41427 (Sept. 18, 1978).

Because MMT had an adverse emissions effect, EPA also examined whether the adverse effect would cause or contribute

2/ EPA has noted that "[i]t is well-established, and Ethyl agrees, that manganese in the fuel will increase the engine-out HC emissions." EPA, Denial of Application for a Fuel Waiver Submitted by the Ethyl Corporation (Nov. 20, 1981) at 7.

to the failure of vehicles to meet their HC emission standards at any time during their useful lives. The Agency concluded that MMT "in fact causes or contributes to failure of vehicles to meet their designed emission standards." *Id.* at 41428. Among other findings, EPA noted that for vehicles using 1/32 g. Mn, three out of four vehicle groups equipped with three-way catalysts and designed for the .41 HC standard in California exceeded the applicable failure rate. *Id.* 3/ EPA also examined the effect of MMT on catalytic converters and concluded that "there is increasing potential for catalyst plugging with continued use of MMT." *Id.*

In the 1981 application, Ethyl sought a waiver for MMT at concentrations of up to 1/64 gpg Mn but submitted data only for concentrations of 1/16 and 1/32 gpg. Ethyl relied upon a mathematical model to predict exhaust emissions at 1/64 gpg. The Administrator concluded that Ethyl again had not met its burden under Section 211 because its mathematical model was inconsistent with hydrocarbon emissions data from the 1978 waiver proceeding and because Ethyl had failed to submit actual emissions data for the 1/64 gpg concentration of MMT.

3/ EPA also noted that the test data were not representative of the national vehicle fleet. *See* 43 Fed. Reg. at 41426.

Like the two preceding applications, Ethyl's current application does not meet the statutory standard for a waiver under Section 211. The statute makes it clear that Ethyl bears the burden of establishing that its fuel additive will not cause or contribute to the failure of emission control systems. As Chrysler's technical analysis demonstrates, however, Ethyl's application does not resolve EPA's concerns about the adverse effects of MMT on hydrocarbon emissions and catalyst plugging. 4/ Ethyl also does not adequately address the adverse health effects of MMT.

Ethyl argues that because MMT raises octane, refiners "will likely" reduce the aromatic content of their fuels if MMT is commercially available. See Ethyl Application at 47. Ethyl maintains that this expected drop in aromatic content, in turn, will reduce tailpipe hydrocarbon emissions and thus reduce the adverse effects of the additive.

4/ Ethyl claims that only a "significant failure" of vehicles in the test fleet supports the denial of a waiver application. See, e.g., Ethyl Application at 44. The U.S. Court of Appeals for the District of Columbia Circuit has rejected that argument and has held that "Section 211(f)(4) speaks in terms of 'a failure' to achieve compliance with the emission standards. We find nothing in the Act or its legislative history to support the . . . added gloss that the relevant question is whether the fuel will cause or contribute to a 'significant failure.'" Motor Vehicle Mfrs. Ass'n of U.S. v. EPA, 768 F.2d 385, 400 (D.C. Cir. 1985), cert. denied, 474 U.S. 1082 (1986).

This argument is strikingly similar to a claim advanced by Ethyl -- and rejected by EPA -- during the 1978 MMT waiver proceeding. Ethyl argued that certain vehicles were "sensitive" to the effects of MMT and suggested that the manufacturers of these vehicles could make simple design changes to counteract the sensitivity of their vehicles.

EPA stated that "[t]he raising of this issue by Ethyl is confusing" because Ethyl also maintained that MMT did not adversely affect emissions. EPA concluded, moreover, that:

[t]he raising of this issue is apparently an attempt by Ethyl to shift the burden from itself to the vehicle manufacturing industry. The statutory requirements for a waiver state that the applicant must establish that the additive does not cause or contribute to any vehicle's failure to meet the emission standards with respect to which it has been certified. Nowhere is there the requirement that vehicle manufacturers must alleviate such failure by modifications. [43 Fed. Reg. at 41426.]

As in the 1978 application, Ethyl's current claim that refiners will counteract the adverse effects of MMT by reducing the aromatic content of their fuels is inconsistent with Ethyl's argument that MMT does not adversely affect HC emissions. It is also irrelevant in this proceeding. Ethyl is required by statute to demonstrate that its fuel additive will not cause the failure of vehicles to meet their emissions standards. That burden cannot be shifted to third parties such as automobile or fuel manufacturers. Ethyl thus cannot support

its application with claims that refiners are "likely" to take steps that will alleviate the effects of MMT.

Chrysler's technical analysis also shows that MMT will cause or contribute to the failure of vehicles to meet the stricter standards currently being considered by Congress and the state of California. The Clean Air Act amendments under consideration by Congress would set a standard for nonmethane hydrocarbons in two stages: .25 gpm for five years or 50,000 miles through model year 1994; and .31 gpm for 10 years or 100,000 miles beginning with model year 1995. Similarly, the proposed legislation contains a total hydrocarbon standard of .31 gpm for five years or 50,000 miles through model year 1994 and .39 gpm for 10 years or 100,000 miles beginning in model year 1995. The emissions warranty for the catalytic converter would be extended under the proposed legislation from 50,000 miles to 80,000 miles. Moreover, the California Air Resources Board is considering even stricter changes to its emission standards and warranty provisions. 5/

EPA has noted that it is appropriate to consider impending standard revisions during a waiver proceeding. In the 1978 MMT decision, the Agency stated that:

5/ See California Air Resources Board, Low-Emission Vehicles/Clean Fuels, Technical Support Document (May, 1990 draft).

The 0.41 HC technology utilized on California vehicles represents a close approximation of the technology to be employed in meeting the stringent 1980 Federal standards. Where the emissions technology is available and imminent, and is reasonably certain to be applied in a prospective model year, the effects of MMT upon such technology should be examined. Any grant of a waiver for the general use of MMT would, due to its widespread use, also necessitate the use of MMT in certification. Thus, the ability of the auto industry to readily produce vehicles if they are required to certify on MMT fuels is a very significant question. [43 Fed. Reg. at 41426.]

As Chrysler's technical analysis indicates, moreover, Chrysler is considering relocating many of its catalysts closer to the engine to reduce exhaust emissions. Ethyl did not adequately address the effects of its additive on these close-coupled catalysts, which are even more prone to plugging than other catalysts.

In conclusion, Ethyl repeatedly cites the environmental and economic benefits it claims will follow from use of MMT. However, these purported benefits have no bearing on the statutory standard: whether Ethyl has established that MMT will not cause or contribute to the failure of vehicles to meet their emission standards at any time during their useful lives. Ethyl has not met that burden.

In an attempt to bolster its application, Ethyl also repeatedly states that the purpose behind the waiver procedures at Section 211 is to encourage the development of promising

fuels and fuel additives. Ethyl fails to note, however, that Section 211(f) was added to the Clean Air Act in response to concerns about the effects of MMT. 6/ Any intent on the part of Congress to permit the development of beneficial fuel additives clearly was accompanied by an equal intent to prevent the introduction of additives that impair vehicle emission performance. Like the two previous MMT applications, Ethyl's current application is the very type of proposal Congress intended to prohibit. Accordingly, the application should be denied.

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6/ See, e.g., H.R. Rep. No. 95-294, 95th Cong., 1st Sess. 308 (1977) ("there are strong indications that MMT . . . fouls spark plugs, plugs up catalytic converters, increases hydrocarbon emissions, and results in rapid deterioration of catalyst efficiency.").